

INFORMATION SHEET

ORDER NO. R5-2009-XXXX
CITY OF TAFT
TAFT FEDERAL PRISON WWTF
KERN COUNTY

Background

The City of Taft (hereafter Discharger or City) owns a wastewater collection and treatment facility (WWTF) that provides sewerage service for about 2400 inmates and employees at the Taft Federal Prison (hereafter Prison). The Discharger contracts with SouthWest Water Company to operate and maintain the WWTF. The WWTF is designed to treat 0.46 million gallons per day (mgd) and consists of headworks with a bar screen and a flow meter, an activated sludge oxidation ditch, a chlorination system, an unlined 10.4-million-gallon capacity emergency storage pond, and eight unlined sludge drying beds. Secondary treated effluent is discharged from the WWTF to Sandy Creek, an ephemeral stream, about 1¼ miles north of the WWTF.

The WWTF is in Midway Valley on the north side of Cadet Road about 1½ miles east of Highway 33 and about 4¼ miles southeast of the City of Taft, Kern County. The City completed the WWTF in 1996 to solely serve the Taft Federal Prison, which is owned by the U.S. Department of Justice, Federal Bureau of Prisons. The WWTF is just east of the Prison and started treating wastewater in October 1997 when the Prison began operating. The City owns the dedicated sewer trunk line that connects to the Prison-owned and -maintained sewer system. Waste Discharge Requirements (WDRs) Order No. R5-2004-0011 prescribed requirements for discharges from the WWTF to Sandy Creek.

Sludge from the secondary clarifier is pumped to the unlined drying beds. Once dried, sludge is stockpiled in an unlined storage area. WDRs Order No. R5-2004-0011 required the City to properly dispose of the dried sludge that had been accumulated and stockpiled on site since the WWTF began operating in 1997. On 5 January 2004, the Discharger provided written certification, including supporting documentation, that the accumulated dried sludge was disposed of at an appropriately permitted facility (San Joaquin Composting, Inc., Kern County). The Discharger currently stockpiles dried sludge for approximately two years before transferring it to SYNAGRO Technologies, Incorporated's, South Kern Compost Manufacturing Facility east of Taft.

The Prison's water supply is from the West Kern Water District and is of high quality, based on the Water District's 2007 Consumer Confidence Report, with an electrical conductivity (EC) of 444 µmhos/cm. Self-monitoring reports from January 2007 to September 2008 indicate that the average source water EC, as measured at the Prison, was 382 umhos/cm and the maximum 12-month average was 439 umhos/cm. The maximum incremental increase between January 2004 and September 2008, based on a monthly average effluent EC and a 12-month rolling source water average, was 319 umhos/cm.

The Discharger's self-monitoring reports from January 2004 to September 2008 characterize the discharge as follows:

<u>Constituent / Parameter</u>	<u>Units</u>	<u>Average Influent</u>	<u>Average Effluent</u>
Monthly Average Daily Flow	mgd	--	0.26
Settleable Solids	mL/L	--	< 0.1
BOD ₅ ¹	mg/L	250	2.8
TSS ²	mg/L	192	2.6
EC ³	µmhos/cm	702	622
Total ammonia (as N)	mg/L	--	0.02 ⁴
Nitrate (as N)	mg/L	--	17 ⁵
Total Residual Chlorine	mg/L	--	2.4

¹ 5-day, 20°C biochemical oxygen demand

² Total suspended solids

³ Electrical conductivity at 25°C

⁴ Non-detect values were set equal to one-half of the detection limit

⁵ Based on four samples.

The WWTF and discharge area are in an arid climate characterized by hot dry summers and mild winters. Average annual precipitation and pan evaporation in the discharge area are 5.8 inches and 95 inches, respectively, according to information published by the Western Regional Climate Center and the California Department of Water Resources (DWR).

Land uses in the WWTF vicinity include extractive industrial (oil fields), undeveloped areas with native vegetation, agricultural, and institutional use (i.e., the Prison immediately west of the WWTF) according to DWR land use data published in 1998. Crops historically grown within one-half mile on either side of Sandy Creek from the discharge point to its terminus include cotton and safflower, although creek water is not known to be used for irrigation.

Sandy Creek originates in the Temblor Range to the west, flows southeasterly through lower Midway Valley then northeasterly, and effectively terminates about three miles before reaching dry Buena Vista Lake, which is about 4½ miles downstream of the discharge point. The bed and bank features of Sandy Creek end approximately 1½ miles downstream of the WWTF discharge point. Beyond the bed and bank features of Sandy Creek is the flat landscape of the San Joaquin valley floor. Sandy Creek is normally dry and flows only during and immediately after storm events. The WWTF discharge creates an induced flow that typically fully infiltrates the streambed completely in approximately one mile, as observed during a staff inspections on 6 June 2002 and 7 November 2008. Typical desert vegetation grows in the Sandy Creek streambed, but wetland vegetation grows where the discharge flows. Sandy Creek has an average slope of about 1.3 percent from the discharge point to its terminus. The California Aqueduct siphons under Sandy Creek about 0.2 miles downstream from the WWTF discharge point and does not obstruct stream flow. Constructed berms also exist between the end of bed and bank features of Sandy Creek and the Buena Vista lakebed. It is very unlikely that Sandy Creek flows would ever reach the dry lake bed.

After the adoption of WDRs Order No. 2004-0011, the Discharger requested a review of whether Sandy Creek is a water of the United States subject to the regulation under the Clean Water Act (CWA) and whether warm freshwater habitat (WARM) is a probable beneficial use of Sandy Creek. Given the evidence that Sandy Creek may be an isolated water body, recent United States Supreme Court decisions concerning CWA jurisdiction over isolated water bodies, and evidence that WARM may not exist, the Regional Water Board adopted Special Order No. R5-2005-0060 on 29 April 2005. Order No. R5-2005-0060 delayed the implementation of dechlorination and continuous total residual chlorine monitoring while the Discharger and the Regional Water Board gathered evidence for formal decisions concerning whether Sandy Creek is a water of the United States and to conduct a Use Attainability Analysis (UAA) to determine whether WARM is a beneficial use of Sandy Creek or one that can probably be dedesignated.

In August 2007, the Discharger requested the United States Army Corps of Engineers (Corps) to complete a jurisdictional determination for Sandy Creek. In a 25 February 2008 letter to the Discharger, the Corps stated that it would not be completing a jurisdictional determination as the Discharger's request was not associated with a permit action under Section 404 of the CWA. The Corps further stated that jurisdictional questions concerning permit actions under Section 401 or 402 of the CWA should be directed to the United States Environmental Protection Agency (USEPA), Region 9.

USEPA, Region 9, conducted an evaluation of the jurisdictional status of Sandy Creek for purposes of the federal CWA. The evaluation included a field investigation of Sandy Creek on 28-29 February 2008 by USEPA staff. Regional Water Board staff participated in the field investigation on 29 February. By a letter dated 10 April 2008, the USEPA transmitted the results of the evaluation and the field investigation findings to the Regional Water Board. In the letter, USEPA stated, "*Available evidence suggests that Sandy Creek, from the Highway 33 crossing to its downstream terminus, is hydrologically isolated from other water, and, therefore, since no other basis for CWA jurisdiction appears to be present, further suggests that Sandy Creek is not a [water of the United States] as defined under the federal CWA and associated regulations.*" Based on information gathered by Regional Water Board staff and USEPA's evaluation, Sandy Creek is not a water of the United States and discharges thereto are not subject to NPDES permitting requirements. Thus, it is appropriate to terminate NPDES Permit No. CA0083755 by rescinding Order No. R5-2004-0011. Sandy Creek is a water of the State as defined in California Water Code (CWC) Section 13050, and thus subject to waste discharge requirements issued pursuant to CWC Section 13263.

Groundwater Conditions

According to the California Department of Conservation, Division of Mines and Geology *Geologic Map of California Bakersfield Sheet (1964)* and U.S. Geological Survey *Taft, Maricopa, and Mouth of the Kern, California* topographic maps, the Midway Valley is underlain by Recent alluvial fan deposits consisting of interbedded sands, silts, and clays overlying the Pleistocene Tulare Formation. The base of the Recent alluvial fan deposits/top of the Tulare

Formation appears to form a barrier to percolating water; thus, percolating water perches at the base of the Recent alluvial fan deposits or on native groundwater according to a 2008 report prepared by Geomega, Inc. entitled *Phase II Groundwater Investigation Report, Valley Waste Disposal Company, Midway Valley – Southeast Taft Area* (Geomega 2008 Report).

DWR maintains depth to groundwater records for three wells near the WWTF (State well numbers 32S24E 24N001, 26A001, and 26N001). Hydrographs for these wells indicate depth to groundwater varied between about 210 and 300 feet below ground surface (bgs) during the monitoring period of 1961 to 1978. The Geomega 2008 Report indicates groundwater exists in the Recent alluvial fan deposits near Sandy Creek northwest of the WWTF at about 100 to 210 feet bgs. The Geomega 2008 Report identifies a monitoring well (21H) that is proximate to Sandy Creek about a mile upgradient of the WWTF discharge point. In October 2007 and March 2008, the depth to groundwater in monitoring well 21H was about 140 feet bgs.

Kern County Water Agency, *Water Supply Report 2000*, indicates groundwater quality in the area of the WWTF and the discharge point is poor quality with total dissolved solids (TDS) of approximately 5,000 mg/L. The Geomega 2008 Report identified monitoring well 21H as being representative of native alluvial groundwater. Presented below are selected analytical results for samples collected from monitoring well 21H:

<u>Date</u>	<u>Calcium (mg/L)</u>	<u>Sodium (mg/L)</u>	<u>Chloride (mg/L)</u>	<u>Sulfate (mg/L)</u>	<u>Nitrate-N (mg/L)</u>	<u>Boron (mg/L)</u>	<u>EC (umhos/cm)</u>	<u>TDS (mg/L)</u>
10/9/2007	460	280	190	1500	4.9	2.6	3100	2700
3/18/2008	620	360	190	1800	14	11	3800	3600

Midway Valley lies in the Midway-Sunset Oil Field, which is one of the older oil producing areas in and around the San Joaquin Valley. In 1955, the California Department of Public Works, Division of Water Resources (now known as the Department of Water Resources) prepared a report *Oil Field Waste Water Disposal, Midway-Sunset Oil Field, Kern County* (DWR 1955 Report) that states oil was first discovered in the Midway-Sunset Oil Field in 1901 and full scale operations existed by 1910. The purpose of the DWR 1955 Report was to determine if disposal of oil production wastes had polluted or may pollute underlying groundwater with mineral constituents. The concern was (and still is) that produced water, which contains high concentrations of dissolved minerals (i.e., EC > 25,000 umhos/cm) and nitrogen (sum of nitrate, nitrite, and ammonia is generally greater than 10 mg/L as N), may impact better quality groundwater (of Sierra Nevada origin) on the San Joaquin Valley floor.

Up until the 1930's, oil field operators discharged the crude oil/produced water mixture directly into natural surface water drainages, including Sandy Creek. Operators constructed dikes on the surface water drainages and skimmed off the oil. In 1932, operators banded together to form Valley Waste Disposal Company for the purpose of managing produced water disposal operations. Disposal sumps were used to skim off the majority of the oil and the remaining

water (containing residual oil) was discharged into natural surface water drainages and eventually reached terminal sumps on the San Joaquin Valley floor.

The DWR 1955 Report and a memorandum prepared by Valley Waste Disposal Company in 1955 include groundwater data for wells within an approximate 2 mile radius of the WWTF outfall to Sandy Creek. These water supply wells were on the east side of the future location of the California Aqueduct, and the groundwater samples were collected between 1953 and 1955. The groundwater data show that the EC ranged from 3,303 to 6,770 umhos/cm and nitrate (as N) concentrations ranged from 0.0 to 59 mg/L. Four of the nine wells for which there were data had at least one nitrate (as N) sample result exceeding 10 mg/L. The DWR 1955 Report concluded that produced water percolating beneath disposal sumps had degraded groundwater supplies the San Joaquin Valley with salts, including nitrates.

Currently, produced water is disposed of in lined and unlined sumps in the Midway Valley area. The produced water evaporates and/or percolates. No produced water discharges to Sandy Creek are known to exist today. Valley Waste Disposal Company operates two produced water disposal pond systems southeast of the City of Taft (SE Taft Ponds) near the banks of Sandy Creek. The ponds are about three miles upgradient of the WWTF outfall to Sandy Creek and are unlined. The smaller of the two systems has been operating since 1958, while operation of the larger system began in 1981. The Geomega 2008 Report indicates that approximately 630,000 gallons per day of produced water are disposed of in the SE Taft Ponds, and historical disposal volumes have approached 1,050,000 gallons per day.

The Geomega 2008 Report contains data for samples collected from groundwater monitoring wells near the SE Taft Ponds. Monitoring well MW-4 is approximately one mile upgradient of the SE Taft Ponds and monitoring wells MW-1 and MW-3 are about one-half and one mile downgradient of the SE Taft Ponds, respectively. The Geomega 2008 Report states that the data indicates percolated produced water from the SE Taft Ponds has impacted groundwater at MW-1, MW-3, and MW-4. Presented below are selected analytical results for samples collected from monitoring wells MW-1, MW-3, and MW-4:

<u>Well No.</u>	<u>Calcium (mg/L)</u>	<u>Sodium (mg/L)</u>	<u>Chloride (mg/L)</u>	<u>Sulfate (mg/L)</u>	<u>Nitrate-N (mg/L)</u>	<u>Boron (mg/L)</u>	<u>EC (umhos/cm)</u>	<u>TDS (mg/L)</u>
MW-1 ¹	920	1090	2534	2090	123	16	10183	8185
MW-3 ¹	790	604	1535	1775	125	4.5	7035	5988
MW-4 ²	2400	1533	3700	1233	1155	7	18333	17000

¹ Results are averages based on four samples collected on 8/11/97, 7/15/05, 11/14/05, and 3/19/08.

² Results are averages based on three samples collected on 7/22/05, 11/15/05, and 3/20/08.

Given the poor quality of native groundwater, the historical groundwater impacts described above, the depth to groundwater, the relatively low WWTF effluent flows, and the fact that WWTF discharge is spread out over a large area, it is unlikely the WWTF discharge has caused or will cause perceptible degradation of groundwater.

Because of its poor quality as documented herein, groundwater in Midway Valley is not known to be used for any beneficial use. West Kern Water District imports and supplies water for essentially all uses, except for irrigation. The Wheeler Ridge-Maricopa Water Storage District imports and supplies irrigation water for the farmlands on the east side of the California Aqueduct. To be used for MUN, groundwater would have to be treated by a process to remove salts, which would also remove nitrate (e.g., reverse osmosis or distillation).

Basin Plan, Beneficial Uses, and Regulatory Considerations

The Water Quality Control Plan for the Tulare Lake Basin, Second Edition, revised January 2004 (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin.

The WWTF and discharge point are in the Taft Hydrologic Area (HA 557.20) of the South Valley Hydrologic Unit (HU 557) of the Tulare Lake Basin. The Basin Plan specifies that surface waters within HU 557 are valley floor waters with the following designated beneficial uses: agricultural supply (AGR); industrial service supply (IND); industrial process supply (PRO); water contact recreation (REC-1); noncontact water recreation (REC-2); WARM; wildlife habitat (WILD); rare, threatened, or endangered species (RARE); and groundwater recharge (GWR).

Not all of the designated beneficial uses are realized. Sandy Creek downstream of the discharge point is surrounded by oil fields and privately owned farms, and is not near any facility or place that people frequent. Storm water runoff only flows in Sandy Creek during and shortly after significant rainfall events. The WWTF discharge flows for less than a mile before disappearing completely in the streambed. As Sandy Creek flows are low, ephemeral, and unpredictable, they are not used for irrigation and are not a viable industrial water supply. The reach of Sandy Creek affected by the WWTF discharge is not surrounded by any significant human habitation and is unattractive for water related recreation as the flows are small (i.e., less than 12 inches deep and 5 feet wide) and dense vegetation makes access difficult. People are far more likely to go to the California Aqueduct for water related recreation.

As previously described, the Discharger questioned that WARM is a probable beneficial use of Sandy Creek. Special Order No. R5-2005-0060 gave the Discharger additional time to implement dechlorination and continuous chlorine monitoring, which were required by Order No. R5-2004-0011 to protect WARM, while Regional Water Board staff and the Discharger gathered information concerning the existence of and potential for WARM in Sandy Creek.

On 9 November 2005, Regional Water Board staff sent the Discharger a letter requesting that the Discharger submit a work plan and implementation schedule for completing a technical report that includes information necessary to support a UAA. The letter indicated, consistent with State Water Resources Control Board precedent (see State Water Board Order WQO

2002-0015), that the Discharger bears the responsibility for providing the information to support a UAA.

On 9 January 2006, the Discharger submitted a UAA work plan for assessing the existence of and potential for WARM in Sandy Creek. The UAA work plan stated that McCormick Biological would conduct a biological assessment of the presence of and potential for WARM during the calendar year 2006. The UAA work plan also stated that BSK Associates would conduct a hydrogeologic assessment of the Sandy Creek drainage.

On 12 May 2008, the California Department of Fish and Game (DFG), at the request of Regional Water Board staff, conducted reconnaissance of Sandy Creek to evaluate whether the WARM is an appropriate designated beneficial use of Sandy Creek. DFG staff observed Sandy Creek from near its headwaters west of the City to its terminus approximately 1.5 miles downstream of the WWTF discharge point. The RARE beneficial use of Sandy Creek was observed during the inspection and is known to exist in reaches upstream of the WWTF discharge. DFG observed WILD throughout the entire inspected reach of Sandy Creek. Downstream of the WWTF discharge cliff swallows were observed foraging over Sandy Creek and California quail, killdeer, and numerous unidentified passerine birds were observed using the riparian vegetation. Consistent with WARM, two breeding western toads were observed in Sandy Creek in the City of Taft, and riparian vegetation and wetland plants were observed downstream of the WWTF discharge. In a 15 September 2008 memorandum from DFG staff to Regional Water Board staff, DFG staff states, *"It is likely that other WARM beneficial uses are present within portions of Sandy Creek absent the current influence of the [WWTF] and stormwater discharges; for example, in years with average or above average rainfall, aquatic insects and breeding western spadefoot toad (Spea hammondi) would likely be present within Sandy Creek. These additional WARM beneficial use indicators were not observed during our site visit, since our site visit was not conducted at the appropriate time of year and both 2007 and 2008 were years with below normal precipitation."* A 15 September 2008 memorandum from DFG to the Executive Officer recommended that WARM, WILD, and RARE remain designated beneficial uses of Sandy Creek.

By 21 October 2008 letter, Regional Water Board staff informed the Discharger that based on DFG's findings and requirements of the California Water Code to protect beneficial uses, Regional Water Board staff does not intend to act on the Discharger's UAA work plan or initiate the process to reconsider the WARM designated beneficial use of Sandy Creek. The letter further stated Regional Water Board staff would proceed with drafting tentative WDRs that includes chlorine effluent limitation to protect WARM and requires installation of chlorine residual monitoring equipment.

The only realized beneficial uses of Sandy Creek known to staff are WARM, WILD, and RARE. Limited REC-1 and REC-2 are possible beneficial uses.

Basin Plan water quality objectives (objectives) define the least stringent criteria that could apply as water quality limitations for surface water and groundwater, except where natural background quality already exceeds the objective. The objectives in the Basin Plan occur in

numeric and narrative form. In issuing waste discharge requirements, the Regional Water Board must implement the Basin Plan, including all its objectives, for the protection of applicable beneficial uses. Water quality objectives include, but are not limited to, objectives for chemical constituents, toxicity, and taste and odor. The toxicity objective requires that waters be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, or animals. The chemical constituent objective states waters shall not contain chemical constituents in concentrations that adversely affect any beneficial use, and, at a minimum, waters designated MUN shall not exceed the maximum contaminant levels (MCLs) in Title 22 of the California Code of Regulations. The tastes and odors objective states that waters shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan requires the application of the most stringent objective necessary to ensure that surface and groundwaters do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect beneficial uses.

Where a Basin Plan narrative objective exists, the Regional Water Board can quantify it by adopting a numeric effluent or receiving water limitation in WDRs that implements the narrative objective in accordance with the translation processes set forth in the Basin Plan. The translation procedure to follow in establishing numerical limitations in waste discharge requirements that will implement Basin Plan narrative objectives is described in pages IV-21 through IV-23 of the Basin Plan. The Regional Water Board must consider, among other things, information submitted by a discharger and other interested parties and relevant numerical criteria and guidelines developed or published by other agencies and organizations on harmful concentrations of constituents.

The Basin Plan encourages recycling and does not consider disposal by evaporation and percolation or discharge to surface waters a permanent disposal solution when the potential exists for recycling. Order No. 96-035 required the City to evaluate reclamation opportunities and report to the Regional Water Board by 3 September 1996 with either an implementation schedule or justification as to why it is not practical to recycle. Regional Water Board files record the City's attempts to effect recycling. The City attempted to provide the effluent to local farmers for irrigation by soliciting proposals for recycling. It received a single proposal that would have required the City to construct a transmission pipeline to the farmer's property and a storage pond, and pay the farmer \$26.00 per acre-foot of effluent. The City determined that it was too costly and by letter dated 3 May 1996 informed the Regional Water Board. The Regional Water Board agreed with the Discharger and found in WDRs Order No. R5-2004-0011 that reclamation was impractical at that time.

Per the Basin Plan policies, plans for wastewater reclamation or reasons why reclamation is not possible are required for new or expanded wastewater facilities. While the WWTF is not new, nor is the City expanding the WWTF, the reclamation policies in the Basin Plan are clear that surface water disposal shall not be a permanent solution when reclamation opportunities exist. A City of Taft representative informed Regional Water Board staff during a 7 November 2008 pre-requirement inspection that the City has engaged in recent discussions with a local farmer about recycling the WWTF effluent. The farmer is interested in conveying the effluent,

via a pipeline, to a nearby agricultural field for irrigation. As a new reclamation opportunity may exist, this Order requires the Discharger to provide information on the feasibility of the opportunity and provide an update on any other recently evaluated opportunities.

Effluent Limitations

This Order prescribes effluent limitations based on the following:

- This Order carries over from WDRs Order No. R5-2004-0011 the flow limitation of 0.46 mgd (design flow) with one exception. The flow limitation in this Order is a monthly average daily flow whereas the flow limitation in WDRs Order No. R5-2004-0011 was expressed as a monthly average daily dry weather flow. This minor change is based on a review of self monitoring reports from 1 January 2004 through 30 September 2008 which shows winter WWTF flows are not greater than the summer flows. Thus, it does not appear inflow and infiltration to the collection system are an issue.
- For BOD₅ and total suspended solids (TSS), a monthly average of 30 mg/L, a weekly average of 45 mg/L, a daily maximum of 90 mg/L, and a removal efficiency of 85 percent were included in WDRs Order No. R5-2004-001 based on the technology-based effluent limits required by Title 40 of the Code of Federal Regulations Part 133 (40 CFR 133). While the WWTF is no longer subject to the requirements of 40 CFR 133, the BOD and TSS effluent limitations contained in WDRs Order No. R5-2004-0011 are considered best practicable treatment or control for wastewater treatment plants with secondary treatment and, thus, are included in this Order.
- The pH effluent limitation is based on the numeric objective in the Basin Plan. For settleable solids, a monthly average of 0.1 ml/L and daily maximum of 0.5 ml/L are adequately protective of the aquatic life in Sandy Creek, which provides no dilution most of the time.
- Order No. R5-2004-0011 limits the effluent EC to 500 umhos/cm over source water or 1,000 umhos/cm, whichever is less. This limitation is consistent with the Basin Plan requirement for discharges to navigable waters. The Basin Plan EC effluent limitation for domestic wastewater facility discharges to land is 500 umhos/cm over source water and 1,000 umhos/cm for discharges that may recharge good quality groundwater. As Sandy Creek is not a navigable water, the WWTF discharge recharges poor quality groundwater, and discharge is not used for agricultural supply, there is no Basin Plan requirement to include the 1,000 umhos/cm cap on the discharge. Nonetheless, 500 umhos/cm over source water effectively limits the discharge to <1,000 umhos/cm (i.e., 439 umhos/cm + 500 umhos/cm), which is protective of all but the most salt-sensitive crops should the City pursue reclamation in the future.

- Chlorine, even in low concentrations, can cause toxicity to aquatic organisms. The City uses chlorine for disinfection of the effluent and does not dechlorinate the effluent before discharging to Sandy Creek. The average effluent total residual chlorine concentration from January 2007 through September 2008 was 2.8 mg/L. USEPA recommends, in its *Ambient Water Quality Criteria for the Protection of Fresh Water Aquatic Life*, a maximum chlorine concentration (1-hour average) of 0.019 mg/L and a continuous chlorine concentration (4-day average) of 0.011 mg/L. These criteria are based on tests conducted using several different species. *Daphnia magna*, a warm water species, and one that occurs in valley floor waters, is cited as the most sensitive freshwater species for the acute criteria. Freshwater chronic tests included two invertebrates (*Daphnia magna* and *Gammarus pseudolimnaeus*) and one fish species (fathead minnow) – all three of which are commonly found in warm water habitat. Thus, the Discharger's use of chlorine as a disinfectant presents a reasonable potential that it could be discharged in toxic concentrations.

The USEPA Technical Support Document for Water Quality-Based Toxics Control, EPA/505/2-90-001, March 1991 (TSD) contains statistical methods for converting chronic (four-day) and acute (one-hour) aquatic life criteria to average monthly and maximum daily effluent limitations based on the variability of the existing data and the expected frequency of monitoring. However, because chlorine is an acutely toxic constituent that can and will be monitored continuously, an average one-hour limitation is considered more appropriate than an average daily limitation. Average one-hour and four-day limitations for chlorine, based on these criteria, are included in this Order to protect the WARM beneficial use of Sandy Creek. No dilution was considered since, absent the discharge, Sandy Creek normally does not flow except during and immediately after storm events. Because the Discharger will not be able to comply with this effluent limitation immediately, this Order provides a time schedule for the Discharger to install the dechlorination equipment necessary to achieve compliance. The time schedule also provides time to install the equipment necessary to continuously monitor the total residual chlorine concentration in the WWTF effluent.

- Untreated domestic wastewater contains ammonia. Nitrification is a biological process that converts ammonia to nitrite and nitrite to nitrate. Inadequate or incomplete nitrification may result in the discharge of ammonia to the receiving stream. Ammonia is known to cause toxicity to aquatic organisms in surface waters. Discharges of ammonia at concentrations toxic to aquatic organisms would violate the Basin Plan narrative toxicity objective. USEPA in its *1999 Update of Ambient Water Quality Criteria for Ammonia* (1999 Ammonia Update) recommends acute (1-hour average; criteria maximum concentration) standards based on pH and chronic (30-day average, criteria continuous concentration) standards based on pH and temperature. While the 1999 Ammonia Update indicates that ammonia is generally more acutely toxic to wild fish than to other aquatic species, this does not appear to be true for chronic toxicity. The 1999 Ammonia Update, in developing the chronic toxicity criterion, identified two genera invertebrates - the amphipod *Hyaella* and fingernail clam *Musculium* - as having the lowest genus mean chronic toxicity sensitivity. These two non-fish aquatic life are more susceptible to

ammonia chronic toxicity than wild fish. WDRs Order No. R5-2004-0011 stated that it is unknown whether the amphipod *Hyaella* and fingernail clam *Musculium* exists or could exist in Sandy Creek and that information is insufficient to conclude that the WWTF discharge has reasonable potential for ammonia toxicity in Sandy Creek. WDRs Order No. R5-2004-0011 required the Discharger to study the impacts of ammonia on the wetted section of Sandy Creek to determine if reasonable potential exists and, if so, to develop and recommend ammonia effluent limitations that are adequately protective of Sandy Creek's warm freshwater habitat.

Self-monitoring reports between 1 January 2004 and 30 September 2008 show that the maximum ammonia concentration was 0.21 mg/L and the average concentration was 0.02 mg/L (non-detect values were set equal to one-half the detection limit). The highest reported effluent pH and temperature values between 1 January 2004 and 30 September 2008 were 8.2 standard units and 28.6 °C, respectively (it should be noted that maximum reported pH and temperature values were not measured on the same day). Under these worst-case pH and temperature conditions and an assumption that the amphipod *Hyaella* and fingernail clam *Musculium* exists in Sandy Creek, the resulting acute and chronic ammonia criteria are 5.73 mg/L and 0.72 mg/L, respectively. In this worst-case scenario, the most stringent ammonia criterion is approximately 3.4 times higher than the maximum recorded effluent ammonia concentration. Therefore, there is no reasonable potential to exceed ammonia criteria and, as such, ammonia effluent limitations are not included in this Order. However, this Order includes an un-ionized ammonia receiving water limitation of 0.025 mg/L based on the Basin Plan objective and requires the Discharger to continue monitoring the effluent and receiving water for ammonia.

- To adequately protect public health, the discharge must be disinfected. The California Department of Public Health's (DPH) *Uniform Guidelines for Wastewater Disinfection* recommends that when discharge is to ephemeral streams with limited use and little or no natural flow during all or part of the year, the effluent have a median coliform bacteria number (MPN) not exceeding 23/100 mL based on the last seven samples for which analyses have been completed. The guidelines also recommend that when a median coliform MPN of 23/100 mL is required, bacteriological samples should be collected at least twice per week. The guidelines recommend a daily maximum total coliform limitation of 20 times the median MPN, or 460/ 100 mL, but WDRs Order No. R5-2004-0011 requires that the daily maximum MPN not exceed 240/100 mL.

The median coliform effluent limitation in this Order is consistent with the DPH guidelines described above, and the daily maximum coliform effluent limitation is carried over from WDRs Order No. R5-2004-0011.

- In addition to that previously described, the Basin Plan's narrative toxicity objective states, "*The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors shall not be less than that for the same water body in areas unaffected by the waste discharge, or, when necessary, for other control water that is consistent with the requirements for "dilution water" as described in Standard Methods*

for the Examination of Water and Wastewater, 18th Edition. As a minimum, compliance shall be evaluated with a 96-hour bioassay. In addition, effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate..." It is appropriate to prescribe acute toxicity effluent limitations in this case as the effluent almost always comprises the entire flow in Sandy Creek. USEPA, Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc.*" Accordingly, effluent limitations for acute toxicity have been included in this Order as follows:

Survival of aquatic organisms in 96-hour bioassays of undiluted effluent shall be no less than any of the following:

- a. 70% for any one bioassay
- b. 90% for the median for any three consecutive bioassays

Sludge Specifications

This Order requires that discharge of sludge and solid wastes from the treatment of wastewater comply with the requirements of Title 27, CCR, Section 20005 et. seq. It requires that storage, use and disposal of sludge and biosolids comply with the self-implementing Federal regulations of 40 CFR 503, which are subject to enforcement by the USEPA, not the Regional Water Board. It also requires that, if the sludge is discharged on land for soil amendment for agriculture, silviculture, horticulture, or land reclamation, it be treated and tested to meet the requirements of 40 CFR 503 and be covered under State Board Order No. 2004-0012-DWQ.

Pretreatment Requirements

In the past, the WWTF had been upset on occasion due to poor pretreatment. The City indicated that it experienced nine upsets totaling at least 263 days in 1998, 1999, and the first three months in 2000 caused by grease and cleaning disinfectants.

This Order requires, as did the previous two Orders, that the City implement pretreatment legal authorities, programs, and controls to ensure indirect discharges do not introduce pollutants to the WWTF that might pass through the treatment system or inhibit or disrupt treatment

processes and cause a violation of the Order. This Order also requires, as did WDRs Order No. R5-2004-0011, that the City implement pretreatment legal authorities, programs, and controls to ensure incompatible wastes are not introduced into the treatment systems that could cause upsets, disruptions or interferences, which may result in violation of this Order. Incompatible wastes may include wastes that create a fire or explosion hazard, corrosives that cause structural damage, solids or viscous materials that may cause obstruction in the sewers, petroleum oil or oil products that may cause interference or pass-through, and pollutants that may cause toxic gases, vapors, or fumes, which may result in acute worker health and safety problems.

Receiving Water Limitations

Receiving water limitations in this Order are based on the Basin Plan, carried over from WDRs Order No. R5-2004-0011, and prescribe requirements that the discharge not cause un-ionized ammonia to be present in excess of 0.025 mg/L, the dissolved oxygen concentration to fall below 5.0 mg/L, the ambient temperature to increase by more than 5°F, or chlorine to be detected in concentrations equal to or greater than 0.01 mg/L. It requires that the discharge not cause the receiving water to contain oils, greases, waxes, pesticides, biostimulatory materials, toxic pollutants, floating materials, taste- or odor producing substances, or other materials that create nuisance or otherwise adversely affect beneficial uses. It assures public health protection by requiring that radionuclides and toxic pollutants are not present in the receiving water in concentrations that may be hazardous to human, plant, animal, or aquatic life. It requires that the discharge not cause the receiving water to contain fecal coliform in any 30-day period exceeding a geometric mean of 200 MPN/100 mL or cause more than 10 percent of total samples to exceed 400 MPN/100 mL.

Groundwater Limitations

This Order prescribes groundwater limitations that prohibit WWTF discharges from causing the groundwater concentrations to exceed baseline concentrations. The WWTF when operated as prescribed herein is not expected to degrade the groundwater quality due to: 1) attenuation of the waste constituents as the discharge percolates through the soil to groundwater at 120 – 160 feet depth, and 2) the poor quality of the groundwater because of extremely high salinity. As the areal groundwater EC is much higher than that of the discharge, the discharge will have no adverse impact on the groundwater.

Whole Effluent Toxicity Testing (Chronic)

The Basin Plan contains a narrative toxicity objective that states, “*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*” (Basin Plan at III-6) Adequate chronic whole effluent toxicity (WET) data is not available to determine if the discharge has reasonable

potential to cause or contribute to an in-stream excursion above of the Basin Plan's narrative toxicity objective. Order No. R5-2004-0011 required the Discharger to conduct annual three-species chronic toxicity testing. The Discharger only conducted the testing once. This Order requires annual chronic WET monitoring for demonstration of compliance with the narrative toxicity objective.

In addition to WET monitoring, this Order requires the Discharger to submit to the Regional Water Board an Initial Investigative Toxicity Reduction Evaluation (TRE) Work Plan for approval by the Executive Officer to ensure the Discharger has a plan to immediately move forward with the initial tiers of a TRE in the event effluent toxicity is encountered in the future. This Order also includes a numeric toxicity monitoring trigger and requirements for accelerated monitoring, as well as, requirements for TRE initiation if a pattern of toxicity is demonstrated.

Monitoring Trigger. A numeric toxicity monitoring trigger of $> 1 \text{ TUc}$ (where $\text{TUc} = 100/\text{NOEC}$) is applied in the provision because this Order does not allow any dilution for the chronic condition. Therefore, a TRE is triggered when the effluent exhibits a pattern of toxicity at 100% effluent.

Accelerated Monitoring. The provision requires accelerated WET testing when a regular WET test result exceeds the monitoring trigger. The purpose of accelerated monitoring is to determine, in an expedient manner, whether there is a pattern of toxicity before requiring the implementation of a TRE. Due to possible seasonality of the toxicity, the accelerated monitoring should be performed in a timely manner, preferably taking no more than 2 to 3 months to complete. The provision requires accelerated monitoring consisting of four chronic toxicity tests every two weeks using the species that exhibited toxicity. Guidance regarding accelerated monitoring and TRE initiation is provided in the TSD. The TSD at page 118 states, "*EPA recommends if toxicity is repeatedly or periodically present at levels above effluent limits more than 20 percent of the time, a TRE should be required.*" Therefore, four accelerated monitoring tests are required in this provision. If no toxicity is demonstrated in the four accelerated tests, then it demonstrates that toxicity is not present at levels above the monitoring trigger more than 20 percent of the time (only 1 of 5 tests are toxic, including the initial test). However, notwithstanding the accelerated monitoring results, if there is adequate evidence of a pattern of effluent toxicity (i.e., toxicity present exceeding the monitoring trigger more than 20 percent of the time), the Executive Officer may require that the Discharger initiate a TRE.

TRE Guidance. This Order, under specific circumstances, requires the Discharger to prepare a TRE Work Plan in accordance with USEPA guidance. Numerous guidance documents are available, as identified below:

- *Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*, (EPA/833B-99/002), August 1999.
- *Generalized Methodology for Conducting Industrial TREs*, (EPA/600/2-88/070), April 1989.

- *Methods for Aquatic Toxicity Identification Evaluations: Phase I Toxicity Characterization Procedures*, Second Edition, EPA 600/6-91/005F, February 1991.
- *Toxicity Identification Evaluation: Characterization of Chronically Toxic Effluents, Phase I*, EPA 600/6-91/005F, May 1992.
- *Methods for Aquatic Toxicity Identification Evaluations: Phase II Toxicity Identification Procedures for Samples Exhibiting acute and Chronic Toxicity*, Second Edition, EPA 600/R-92/080, September 1993.
- *Methods for Aquatic Toxicity Identification Evaluations: Phase III Toxicity Confirmation Procedures for Samples Exhibiting Acute and Chronic Toxicity*, Second Edition, EPA 600/R-92/081, September 1993.
- *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms*, Fifth Edition, EPA-821-R-02-012, October 2002.
- *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, EPA-821-R-02-013, October 2002.
- Technical Support Document for Water Quality-based Toxics Control, EPA/505/2-90-001, March 1991

Antidegradation

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality of Waters in California," or "Antidegradation Policy" require that waters of the State that are better in quality than established water quality objectives be maintained "*consistent with the maximum benefit to the people of the State.*" Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan.

The Regional Water Board conducted an antidegradation analysis and concluded that the discharge was consistent with the Antidegradation Policy when it adopted WDRs Order No. R5-2004-0011. No further antidegradation analysis is required as this Order does not authorize, nor has the City requested, an increase in permitted volume or mass of pollutants discharged from what the Regional Water Board previously approved.

Monitoring

Section 13267 of the CWC authorizes the Regional Water Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the State. In recent years there has been increased emphasis on obtaining all necessary

information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Monitoring is required pursuant to CWC Section 13267 and is necessary to ensure compliance with this Order and to monitor for impacts on the receiving water.

The monitoring and reporting requirements of this Order are generally the same as WDRs Order No. R5-2004-0011. The only significant difference is explained below.

The Regional Water Board, by letter dated 27 February 2001 pursuant to CWC Section 13267, required the Discharger to monitor the discharge and receiving stream for priority pollutants. It required the Discharger to submit test results for priority pollutants from two rounds of sampling. The Discharger conducted the first sampling event in July and August 2002. Six priority pollutants (arsenic, selenium, bromodichloromethane, chloroform, chloromethane, dibromochloromethane) were detected above their respective practical quantitation levels (PQLs), but at concentrations lower than applicable water quality criteria. The City did not submit the test results for the second round of priority pollutant sampling. WDRs Order No. R5-2004-0011 stated that additional priority pollutant monitoring is necessary to complete the reasonable potential analysis; thus, WDRs Order No. R5-2004-0011, Provision H.7, required the Discharger to complete the required monitoring and submit the data by 3 May 2004.

On 15 March 2004, the Discharger submitted priority pollutant data in response to WDRs Order No. R5-2004-0011, Provision H.7, for effluent and receiving water samples collected on 29 December 2003. The data was incomplete as the Discharger failed to submit metals, pesticide, PCB, and volatile organic compounds (VOC) data for the effluent. The semi-VOC results were non-detect with the exception of bis(2-Ethylhexyl) phthalate (9.3 ug/L). WDRs Order No. R5-2004-0011 also required the Discharger to conduct one round of priority pollutant sampling in the fourth year of the Order. In an attempt to satisfy this requirement, the Discharger submitted effluent priority pollutant data for a sample collected on 15 April 2008. The results were incomplete as metals and VOC data were missing. The semi-VOC, PCB, and pesticide analytical results were non-detect.

Bis (2-ethylhexyl) phthalate was detected in one of two samples since adoption of WDRs Order No. R5-2004-0011. Bis (2-ethylhexyl) phthalate is used primarily as one of several plasticizers in polyvinyl chloride (PVC) resins for fabricating flexible vinyl products. According to the Consumer Product Safety Commission, USEPA, and the Food and Drug Administration, these PVC resins are used to manufacture many products, including soft squeeze toys, balls, raincoats, adhesives, polymeric coatings, components of paper and paperboard, defoaming agents (MBAS), animal glue, surface lubricants, and other products that must stay flexible and noninjurious for the lifetime of their use. The Discharger performed composite sampling of bis(2-ethylhexyl)phthalate, and the plastic tubing used in composite sampling may have contaminated the samples. Due to the sampling method used to collect the data, the data for bis(2-ethylhexyl)phthalate may be unreliable. In addition, the criteria for bis(2-ethylhexyl)phthalate are based on MUN and the presence of fish and shellfish. For the reasons explained below, the bis(2-ethylhexyl)phthalate criteria do not apply to Sandy Creek.

On 23 December 2008, the Discharger submitted metals and VOC data for an effluent sample collected on 13 November 2008. Bromodichloromethane, chloroform, and dibromochloromethane were detected at concentrations of 7.3 ug/L, 21 ug/L, and 1.5 ug/L, respectively, which do not exceed applicable criteria (MUN-based criteria and California Toxics Rule organisms only criteria are not appropriate for Sandy Creek; see next paragraph). The following priority pollutant metals were detected: hexavalent chromium (0.082 ug/L, estimated), antimony (0.50 ug/L, estimated), arsenic (4.6 ug/L), cadmium (0.30 ug/L, estimated), copper (4.9 ug/L, estimated), lead (0.24 ug/L, estimated), mercury (0.020 ug/L, estimated), nickel (1.9 ug/L, estimated), and zinc (25 ug/L, estimated). The detected metal concentrations were below the applicable criteria for Sandy Creek. Hardness-dependent metals criteria were calculated using the lowest observed effluent hardness of 76 mg/L as CaCO_3 .

While priority pollutant sampling and compliance with California Toxics Rule criteria are typically required only of NPDES permitted facilities, it is appropriate to require the Discharger to collect priority pollutant data for those constituents which have aquatic life criteria. This Order requires the Discharger to sample for those priority pollutants that the Discharger did not sample for as required by WDRs Order No. R5-2004-0011 and that have aquatic life criteria (i.e., metals, pesticides, and PCBs). Most priority pollutants (i.e., VOCs and semi-VOCs) only have California Toxics Rule human health based criteria that are applicable to waters designated MUN or where consumption of fish and shellfish occurs. Sandy Creek is not designated MUN and fish and shellfish are not known to exist or likely to exist in Sandy Creek. Once the additional priority pollutant data required by this Order is submitted, Regional Water Board staff will be able to expand the reasonable potential analysis.

Since the Discharger has identified oil and grease as wastes causing occasional upsets of the treatment process in the past, this Order continues to require the City to monitor oil and grease monthly.

This Order carries over the current requirement to monitor the sludge at least annually, in accordance with USEPA's *POTW SLUDGE SAMPLING AND ANALYSIS GUIDANCE DOCUMENT, AUGUST 1989*, and test for arsenic, cadmium, chromium, molybdenum, copper, lead, mercury, nickel, selenium, and zinc and submit an annual summary of sludge discharge operations.

CEQA

On 7 September 1993, the City certified an EIR/EIS for construction and operation of the prison, construction of the WWTF, and the extension of a water supply pipeline. The Discharger adopted the EIR in accordance with the Public Resources Code, and WDRs Order No. 96-035 stated the Regional Water Board “*has reviewed the EIR and concurs there are no significant impacts to water quality.*”

There has been no expansion of WWTF use beyond what was considered in the EIR/EIS mentioned above. To comply with this Order, the Discharger will only need to add

dechlorination and monitoring equipment to the existing facility. These minor changes to the WWTF will not result in significant environmental impacts. To the contrary, the changes will reduce impacts to the environment. Thus, the action to adopt this Order is exempt from the provisions of CEQA (Public Resources Code Sections 21100-21177), pursuant to Title 14 California Code of Regulations Section 15301, Class 1 exemption for minor alterations to existing facilities with no expansion of existing use.

Reopener

The conditions of discharge in this Order were developed based on currently available technical information, currently available discharge and surface water quality information, applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to adequately assess the potential for the WWTF discharge to exceed water quality objectives. Additional information must be developed and documented by the Discharger as required by schedules set forth in this Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible and that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws and regulations change, or if new information necessitates the implementation of effluent limitations that adequately protect water quality.

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